

are only moderately coarse. *Elytra* oblong-oval, much narrowed posteriorly; they are punctate-striate on the disk; towards the base and sides the punctures are distinct, but the striæ are not; the interstices are plane and minutely and closely sculptured. *Antennæ* sparsely pubescent.

*Underside* with a few small grey setæ; the prosternum with some coarse shallow punctures, the ventral segments finely sculptured.

Length (rostr. incl.)  $2\frac{3}{4}$ , breadth  $\frac{7}{8}$  line.

Auckland Islands.

Described from one example found amongst moss in July 1903 by Mr. L. Cockayne, in whose honour it has been named. The specimen was forwarded to me by Professor Chilton.

Auckland,  
17th March, 1905.

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LXXIII.—*Natural History Notes from the R.I.M.S. Ship 'Investigator,' Capt. T. H. Heming, R.N., commanding.*—Series III., No. 7. *Preliminary Report on the Deep-Sea Alcyonaria collected in the Indian Ocean.* By Prof. J. ARTHUR THOMSON, M.A., and W. D. HENDERSON, M.A., Carnegie Scholar, University of Aberdeen.

A RICH and interesting collection of Deep-Sea Alcyonarians dredged in the Indian Ocean by the 'Investigator' was entrusted to us for examination and report by Prof. A. Alcock, LL.D., F.R.S., of the Indian Museum, Calcutta. As a second consignment received this year has more than doubled the original collection, it has seemed advisable to publish a brief preliminary notice of those forms which we have been able to examine. We have not in this communication given anything like full diagnoses of the new forms or more than a few measurements; we have merely indicated the general nature of the first consignment of the collection. We hope to complete the report in the course of this year.

*Provisional List of Species.*

*Symphodium indicum*, sp. n.

— *incrustans*, sp. n.

*Clavularia decipiens*, sp. n.

*Sarcophytum parvum*, sp. n.

— *fungiforme*, sp. n.

*Spongodes rosca*, *Kükenthal*.

- Syngodes rakayæ*, *Hickson & Hiles*.  
*Chironophthya variabilis*, *Hickson*.  
*Dasygorgia ramosa*, sp. n.  
 — *aurea*, sp. n.  
*Strophogorgia Verrilli*, *Wright & Studer*.  
*Herophila gracilis*, sp. n.  
*Ceratoisis palmæ*, *Wright & Studer*.  
*Acanella rigida*, *Wright & Studer*.  
*Primnois alba*, sp. n.  
*Primnoa Ellisii*, *von Köch*.  
*Calypterinus Allmani*, *Wright & Studer*.  
*Stenella* sp.  
*Thouarella* sp.  
*Paramuricea* sp.  
*Muricea bengalensis*, sp. n.  
 — sp.  
*Callistephanus Koreni*, *Wright & Studer*.
- Scirpearella moniliforme*, *Wright & Studer*.  
 — *alba*, sp. n.  
*Juncella elongata* (*Pallas*).  
*Telesto rubra*, *Hickson*.  
 — *Arthuri*, *Hickson & Hiles*.  
*Protocaulon indicum*, sp. n.  
*Protoptilum medium*, sp. n.  
*Juncoptilum Alcocki*, gen. et sp. n.  
*Microptilum Willemoesi*, *Kölliker*.  
*Leptoptilum* sp.  
*Kophobelemon Burgeri*, *Herklots*.  
 Several sp. of *Umbellula*.  
*Anthoptilum Murrayi*, *Kölliker*.  
*Funiculina* sp. ?  
*Stachytilum fuscum*, sp. n.  
*Pennatula Murrayi*, *Kölliker*.  
 Three other species of *Pennatula*.  
*Pteroeides* sp.

## Order STOLONIFERA.

### Family Cornulariidae.

#### *Sympodium indicum*, sp. n.

A specimen forming a complete tube round a hollow vegetable axis; the granular greyish-white cœnenchyma is thickly covered with large polyps irregularly arranged; the spicules are rough warty spindles and quadrate forms.

*Locality*. Andamans, 265 fath.

#### *Sympodium incrustans*, sp. n.

A large specimen encircling a fragment of the stem of a plant; the whole surface of the membranous stolon and of the large polyps is covered with warty spindles and rods, many of which are visible to the naked eye; the polyps are mostly in groups of two or three.

*Locality*. Andamans, 371 fath.

#### *Clavularia decipiens*, sp. n.

Two specimens of a remarkable and difficult form seem referable to the genus *Clavularia*. They envelop and almost conceal a straight siliceous axis (0.1–0.3 mm. in diameter, 70 and 110 mm. in length, probably the flinty fibre of a glass-rope sponge). The cœnenchyma is thin and consists mainly of a feltwork of spicules. The polyps, including the retracted tentacles, have a length of 3 mm., and are

separated by intervals of 1-7 mm. The calyx is ridged and abundantly spiculated. The spicules are warty spindles, the largest of which are 0.2-0.3 mm. in length, while many are very much smaller.

*Locality.* Andamans, 238-290 fath.

## Order ALCYONACEA.

### Family Alcyoniidæ.

#### *Sarcophytum parvum*, sp. n.

A small red colony attached to a piece of coral; the capitulum is slightly mushroom-shaped; the polyps are more numerous and smaller round the margin, vary from 4-18 mm. in length, and are thickly coated with spicules; the polyp-spicules are (1) long rod and spindles with very few and very small spines, (2) small clubs spinose at the broad end and interlocking to form a sort of feltwork, and (3) small double clubs.

*Locality.* Station 232, 430 fath.

#### *Sarcophytum fungiforme*, sp. n.

A mushroom-shaped colony, red-brown in colour except the retractile portions of the polyps, which are yellowish; the autozooids are uniformly distributed over the surface and the numerous siphonozooids fill up the gaps; the spicules are (1) slender spinules with few spines, (2) smaller clubs spinose at the thick end, (3) still smaller double clubs, and (4) very minute irregular forms.

*Locality.* Station 204, 180-217 fath.

### Family Nephthyidæ.

#### *Spongodes rosea*, Kükenthal.

A specimen which approximates closely to this species, except that some of the spicules are twice as long as the longest described by Kükenthal, and that the coloration is slightly different.

*Locality.* Bay of Bengal, 88 faths.

#### *Spongodes rakayæ*, Hickson & Hiles.

A specimen which agrees almost thoroughly with this species except in a small detail concerning the projecting polyp-spicules.

*Locality.* Station 237, 90 fath.

*Chironophthya variabilis*, Hickson.

Numerous fragments, probably belonging to one large colony, seem referable to this variable species; the deep coral-red spicules of the anthocodæ form a striking colour-contrast with the white or pale pink branches.

*Locality.* Bay of Bengal, 88 fath.

Order AXIFERA.

Family Dasygorgidæ.

*Dasygorgia ramosa*, sp. n.

A profusely branched colony, the fifth branch directly above the first; a long slender polyp on each node; the polyp-spicules are arranged longitudinally, except for two small portions on each side of the base, where they are obliquely transverse; the spicules are warty spindles or flat sword-like forms with serrated edges. This form approaches *D. spiculosa*, but has smaller polyps and larger spicules.

*Locality.* Station 202, 695 fath.

*Dasygorgia aurea*, sp. n.

Fragments of a colony with a beautiful golden-yellow axis, with helicoid branching—the fourth branch usually over the first; the polyps are bell-shaped, with eight projecting points, with spirally disposed spicules; the spicules are rods, spindles, and flat irregular forms mostly quite smooth. This form comes near *D. squarrosa*, but cannot be identified with it.

*Locality.* Station 202, 695 fath.

*Strophogorgia Verrilli*, Wright & Studer.

Three fragments seem referable to this species. In one the basal attachment is present and consists of a number of root-like processes very calcareous and translucent. The axis is hair-like, very calcareous, and brittle except at the tip; the spicules are irregular in shape, some of the spindles reach a length of 2 mm.

*Locality.* Andaman Sea, 375–190 fath.

*Herophila gracilis*, sp. n.

A delicate graceful colony with branches coming off on all sides; the basal attachment consists of very calcareous semi-transparent milk-white root-like processes; the axis is

yellowish and tapers to a thread-like fineness; the branches are disposed in a spiral and the axis is somewhat zigzag; the polyps are distant, usually only one on a node, in some parts all on one side, in other parts in an apparent spiral arrangement; the polyp-spicules lie parallel to the long axis of the polyp except at the base, where they take an oblique direction and finally run parallel to the stem; the superficial spicules are short rods, rounded at the ends, and bearing very minute rough points; besides these there are quadri-radiate spicules with an X-shaped marking, and a number of minute spherical spicules with relatively long projecting spines.

*Locality.* Station 241, 606 fath.

#### Family *Isidæ*.

##### *Ceratoisis palmæ*, Wright & Studer.

Two fragments which agree in every respect with the description given by Wright and Studer.

*Locality.* Andaman Sea, 500 fath.

##### *Acanella rigida*, Wright & Studer.

A complete bushy colony, with branches in verticels of two, three, or four, with prominent rigid polyps covered with fusiform spicules.

*Locality.* Laccadive Sea, 703 fath.

##### *Primnoisis alba*, sp. n.

The basal portion is a broad calcareous plate; the axis with its alternate horny and calcareous joints is longitudinally grooved; the branches are given off from the calcareous internodes and begin with a horny node; the cœnenchyma is thin and creamy white; the low roughly conical verrucæ occur in fours either in a spiral or in a whorl; the spicules are irregular flat disks and rods with numerous prominent warts.

*Locality.* Andamans, 270-45 fath.

#### Family *Primnoidæ*

##### *Primnoa Ellisii*, von Koch.

This beautiful species, described by von Koch from near Naples, also found by Herdman off Ceylon, was obtained by the 'Investigator' at the Andaman Islands (270-45 fath.)—a wide and interesting geographical distribution.

*Calypterinus Allmani*, Wright & Studer.

The branches arise alternately on three sides of the main stem; the iridescent axis shines through the thin cœnenchyma; the polyps occur in verticels of four, but on one side a bare strip is left which is formed into a canal by the large flat polyp-spicules. The locality confirms the suggestion made by Wright and Studer that this is a deep-sea species.

*Locality.* Laccadive Sea, 703 fath.

*Stenella* sp.

The branching is fairly profuse and not confined to one plane; the axis is brown in colour and horny in texture, with a poor development of calcareous corpuscles; the spicules are flat scales, straight or curved spindles, spindles sharply bent at an angle, and irregular spinose forms. The specimen approaches *Stenella acanthina*, Wright & Studer.

*Locality.* Andaman Sea, 112 fath.

*Thouarella* sp.

The axis is very calcareous, iridescent, longitudinally grooved; the branches arise on the two lateral faces; the stiff rigid polyps occur in opposite pairs on the branches and singly on the sides of the main stem; they are covered with flat scale-like spicules and have eight projecting spines extending considerably beyond the opercular surface; the spicules are flat, irregular, multi-tuberculate scales, many with a long smooth projecting spine; they are very like those of a *Stenella*. The specimen approaches *Thouarella Moseleyi*, Wright & Studer.

*Locality.* Laccadive Sea, 703 fath.

## Family Muriceidæ.

*Paramuricea* sp.

A Muriceid consisting of a simple stalk with one clavate branch. The axis is dark brown, with a lighter core; the bluntly conical verrucæ arise from three surfaces, those in one row alternating with those in the others. Irregularly arranged spicules cover the polyps; crown and point spicules protect the tentacles; the whole cœnenchyma is rough with projecting spicules—straight or curved warty spindles, tri-, quadri-, sexradiate forms, spindles with a foliar expansion on one side, and irregular forms.

*Locality.* Andamans, 265 fath.

*Muricella bengalensis*, sp. n.

A much-branched almost bushy colony of a pinkish tint, with prominent verrucæ which usually arise on the lateral faces alternately and at right angles; the spicules of the verrucæ project at the bluntly conical apices and the colourless spicules of the tentacles are arranged longitudinally with a basal collaret of transverse rows; the spicules of the general cœnenchyma are straight or curved warty spindles, dark red, light pink, or colourless.

*Locality.* Bay of Bengal, 88 fath.

*Muricella* sp.

Another colony of a pink colour, with yellowish lateral verrucæ, has the branching confined to one plane; the dark brown axis shines through the thin translucent cœnenchyma.

*Locality.* Bay of Bengal, 88 fath.

Family Gorgonidæ.

*Callistephannus Koreni*, Wright & Studer.

This form differs from that described by Wright and Studer in not having the verrucæ confined to the lateral surfaces and in showing more profuse branching.

*Locality.* Andaman Sea, 238–290 fath.

Family Gorgonellidæ.

*Scirpearrella moniliforme*, Wright & Studer.

An unbranched fragment may be referred to this species, with which it agrees as regards the shape of the spicules, the low verrucæ, the marked grooving of the axis, and so on. It differs in having more than ten grooves on the axis, and the measurements of the spicules are nearer *Sc. gracilis*, Wright & Studer.

*Locality.* Andamans, 270–45 fath.

*Scirpearrella alba*, sp. n.

A long white colony differs from *Sc. moniliforme* in having only two rows of verrucæ, in not having a deeply grooved axis, in the size of the polyps, and so on. The spicules are spiny spindles, double clubs, and irregular stars.

*Locality.* Bay of Bengal, 88 fath.



*Juncella elongata* (Pallas).

Several brick-red fragments agree well with this species, but there is a trace of a longitudinal bare streak and ridge; the spicules are spiny spindles, double clubs, and double stars; no "triple stars" were found.

*Locality.* Bay of Bengal, 88 fath.

## Order STELECHOTOKEA.

## Section I. ASIPHONACEA.

## Family Telestidæ.

*Telesto rubra*, Hickson.

A single specimen, apparently a complete young form, with a spreading base and one branch. The polyps, which measure 2.5 mm. in height, arise at right angles to the stem and are arranged on the four sides in such a way that they seem to form a spiral. In the ridges on the axis, in the minute quantity of horny matter, and otherwise the specimen agrees with Hickson's description.

*Locality.* Andamans, 120 fath.

*Telesto Arthuri*, Hickson & Hiles.

A white colony closely resembling *T. Arthuri*, e. g. in having no grooving, in there being no axis, in the arrangement of the polyps in short spirals or in whorls and singly, and in the shape of many of the spicules—spindles straight and curved, triradiate, and quadriradiate forms. It differs in not having the secondary polyps so closely crowded. It is evidently a young form.

*Locality.* Station 232, 430 fath.

## Section II. PENNATULACEA.

## Family Protocaulidæ.

*Protocaulon indicum*, sp. n.

Three complete specimens, with short thin stalk, long rachis, *opposite* biserial polyps, quadrangular axis, and no spicules. The larger zooids are sexually mature.

*Locality.* Station 239, 55 fath.



## Family Protoptilidæ.

*Protoptilum medium*, sp. n.

An incomplete specimen, granular in texture, with spindle-shaped or rod-like, colourless, ribbed spicules, free from warts or spines. At the basal end there is a small globular swelling with very thin walls, above that there is a longer spindle-shaped swelling; from the upper end of the latter two grooves run up the rachis, one prorachidial, the other metarachidial. At the lower end of the rachis the immature polyps form a single row on each pararachidial surface, those on one side alternating with those on the other. As the polyps reach maturity they assume a more dorso-lateral position; they are large (4.5-5.5 mm.), closely apposed to the stem, abruptly truncated, and the retracted tentacles form an eight-rayed star.

The specimen seems intermediate between *P. aberrans*, Köll., and *P. Carpenteri*, Köll.

*Locality.* Station 151, 142-400 fath.

*Juncoptilum Alcocki*, gen. et sp. n.

Eight unbranched fragments of an interesting new form. The white axis is cylindrical and subcylindrical; the verrucæ are at first in short spirals, but alternate higher up, they contain abundant ova (0.15-0.2 mm. in diameter) and some flat circular *embryos* (0.52-0.55 mm. in diameter); the spicules are slender fluted rods from a very pale to a deep sherry colour. Above each verruca and a little to one side there are two small oval openings; if these represent rudimentary autozooids, the specimens approach *Leptoptilum*, but differ in having appressed verrucæ without projecting spines; if they represent siphonozooids, the specimens approach *Protoptilum*, but differ in not having the polyps in groups of three or two. The occurrence of viviparity, as in Hickson's *Gorgonia capensis*, is of interest.

*Locality.* Station 231, 836 fath.

*Microptilum Willemoesi*, Kölliker.

A complete specimen, with cylindrical axis, quadrangular to cylindrical stalk, alternate biserial zooids, needle-like spicules, and so on, is referable to this species.

*Locality.* Andaman Sea, 650 fath.

*Leptoptilum* sp.

Two fragments, with quadrangular grooved axis, with biserial alternate colourless polyps (7 mm. in length by 2 mm. in breadth, with eight projecting acicular points), approaches *L. gracilis*, but the polyps of that species are described as 3-4 mm. in length.

*Locality.* Bay of Bengal, 753 fath.

Family Kophobelemnoidæ.

*Kophobelemnon Burgeri*, Herklots.

A complete colony, slightly club-shaped, 57 mm. in height, agrees closely with the description given by Wright and Studer.

*Locality.* Station 169, 91 fath.

Family Umbellulidæ.

The collection includes representatives of five or six species of *Umbellula* which have not been adequately studied as yet.

Family Anthoptilidæ.

*Anthoptilum Murrayi*, Kölliker.

Two incomplete specimens with the polyps all rubbed off. The pit-like markings left show that the autozooids were arranged in oblique transverse rows of two or three. The prorachidial surface is marked by a deep broad groove, the metarachidial surface by a narrow groove, so that the polyp-bearing surface is divided into two strips.

The specimens differ from *A. Murrayi* in being altogether dull white, while the 'Challenger' specimen was pale red, with brown polyps and colourless stalk. Moreover, the axis in the present specimens is more or less quadrangular, not cylindrical.

*Locality.* Station 104, 1000 fath.

Family Funiculinidæ.

*Funiculina* sp. ?

Twelve specimens with quadrangular axis grooved on each side, with a basal club-shaped swelling, with dark-coloured autozooids with spicular calices in groups of four, with minute white prorachidial siphonozooids. The spicules are long smooth rods with ribs.

*Locality.* Station 197, 403 fath.

*Stachyptilum fuscum*, sp. n.

A club-shaped specimen, with autozooids arranged in ten oblique rows on each side, each row consisting of 3-4 polyps, with brown siphonozooids on the surface not occupied by the autozooids. The spicules are rod-like with jagged ends and 4- or 5-rayed forms, some vertebra-like. In several respects the specimen approaches *St. Macteari*.

*Locality.* Station 213, 137-131 fath.

## Family Pennatulidæ.

The collection also includes *Pennatula Murrayi*, Kölliker, and three other species, and one species of *Pteroeides*.

LXXIV.—*Description of Acara subocularis*, Cope.

By C. TATE REGAN, B.A.

THE species described below has generally been placed in the genus *Geophagus*, no doubt on account of its resemblance to *Geophagus cupido*, Heck. This will explain its omission from my revision of the genus *Acara* in the April number of the 'Annals.' Mr. Rudolf von Ihering recently brought me an example for identification, and when I determined it as *Geophagus Thayeri* he pointed out that there was no lobe on the upper part of the anterior branchial arch. In none of the three specimens in the British Museum Collection is there any trace of a lobe on the upper part of the anterior branchial arch. Consequently this species falls in the genus *Acara*, and there can be no doubt that its position is next to *Acara Geayi*, Pellegr., which it resembles in many respects. It is worth notice that in most species of *Acara* the scales of the thoracic region are nearly as large as those on the side of the body, in *A. rivulata* they are smaller, in *A. Geayi* considerably smaller, and in *A. subocularis* very small.

*Acara subocularis*.

*Geophagus (Mesops) Thayeri* (non *Acara Thayeri*, Steind.), Steind. Sitzb.

Ak. Wien, lxxi. 1875, p. 108, pl. iii. fig. 2.

*Acara subocularis*, Cope, Proc. Am. Phil. Soc. xvii. 1878, p. 696.

*Geophagus Thayeri*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 189 (1904).

Depth of body  $2\frac{1}{3}$ - $2\frac{1}{2}$  in the length, length of head  $3\frac{1}{4}$ - $3\frac{1}{3}$ .